Dresden Realtime Operating System

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Outline

Motivation & Goals

DROPS

L^4Linux

Example Component: File System

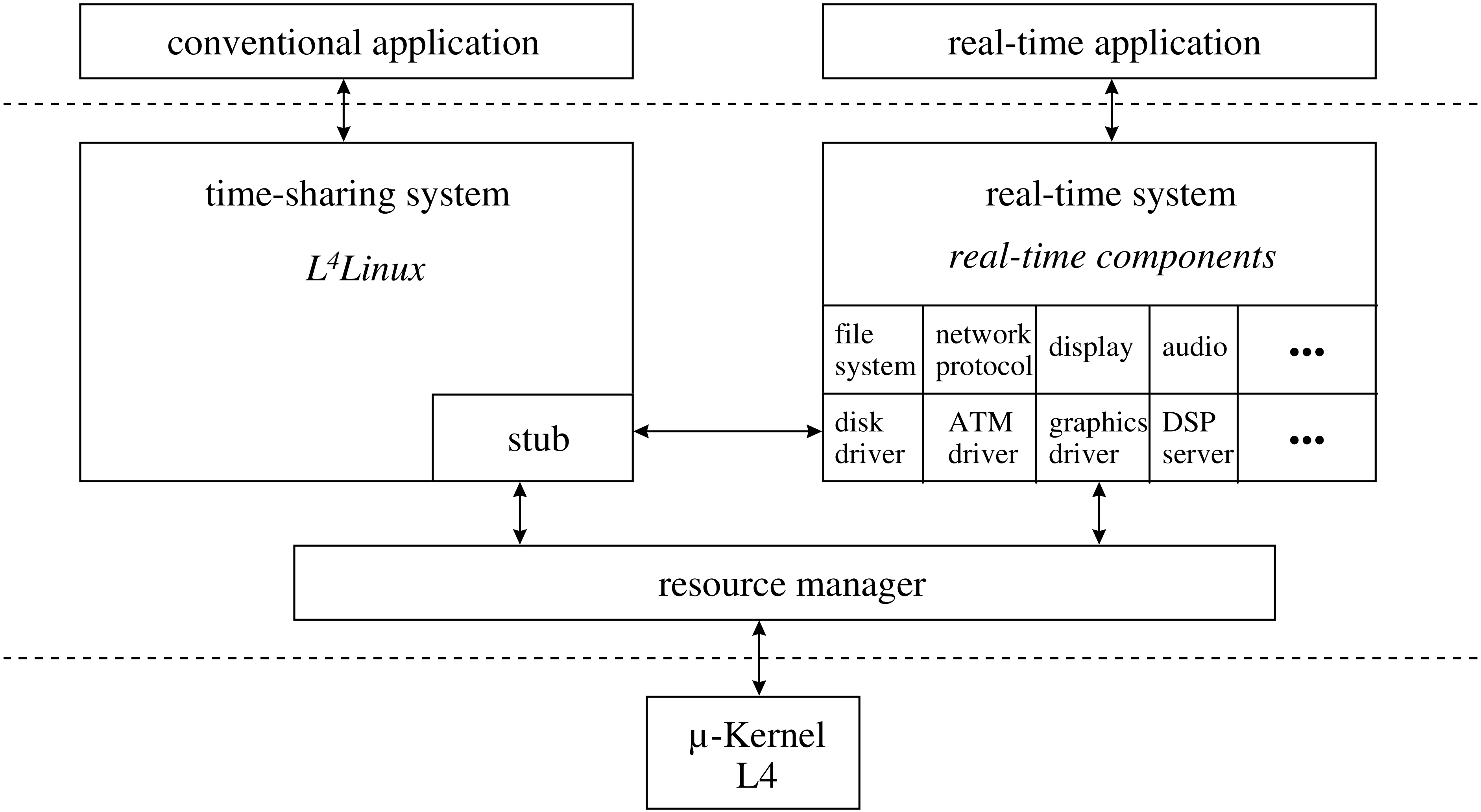
Multimedia Accelerators

Status, Outlook

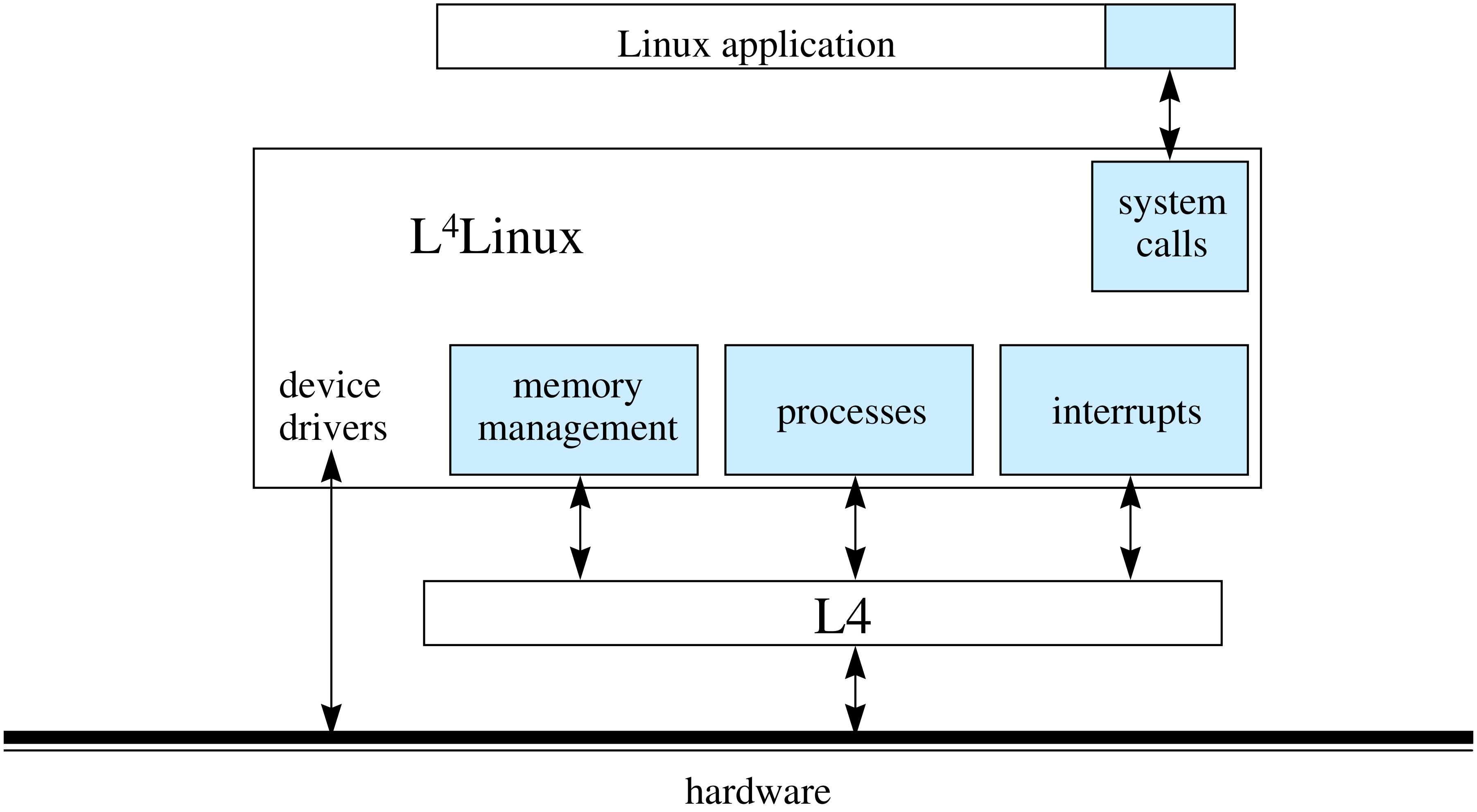
Project’s Goals

- Real-Time and Time-Sharing systems coexisting
- partitioning of resources (CPU, caches, network bandwidth, accelerators, presentation component)
- guarantee of QoS parameters for a chain of OS components
- systematic design & implementation
- competitive system
- interaction with other SFB projects

DROPS System Architecture



L⁴Linux Structure



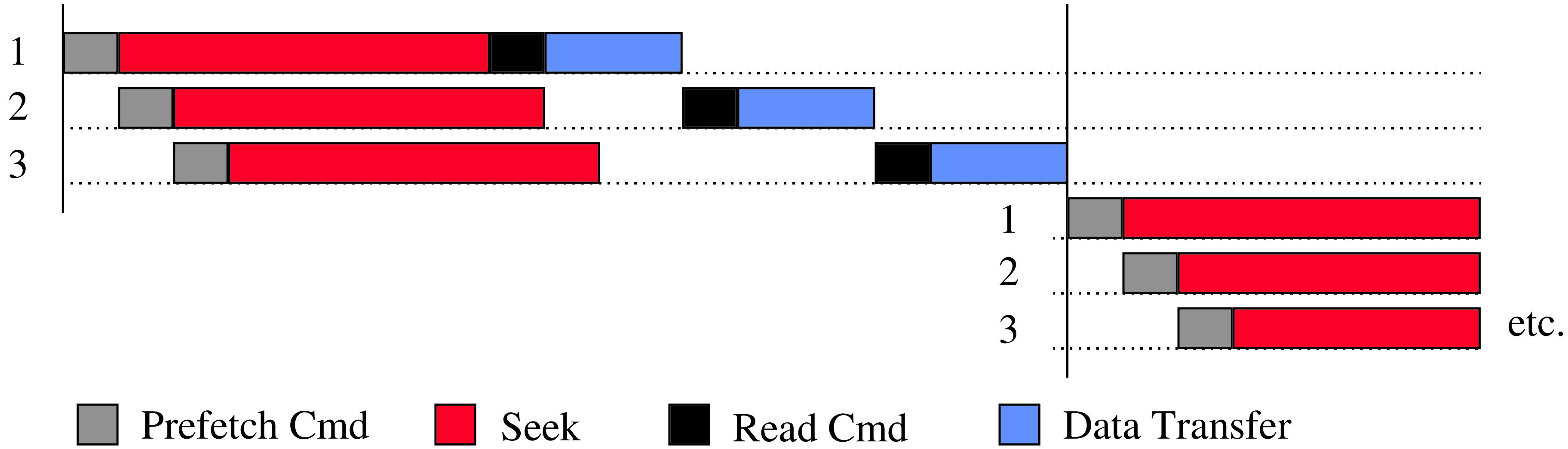
Real-Time File System (I)

<u>Problem:</u> several data streams with different access rates
access several disks simultaneously

- Server-Push-Principle (file system is active component)
- focus on SCSI bus partitioning and optimum utilization
- slotting bus (avoid conflicts)
- analyzing physical data layout to minimize seek times

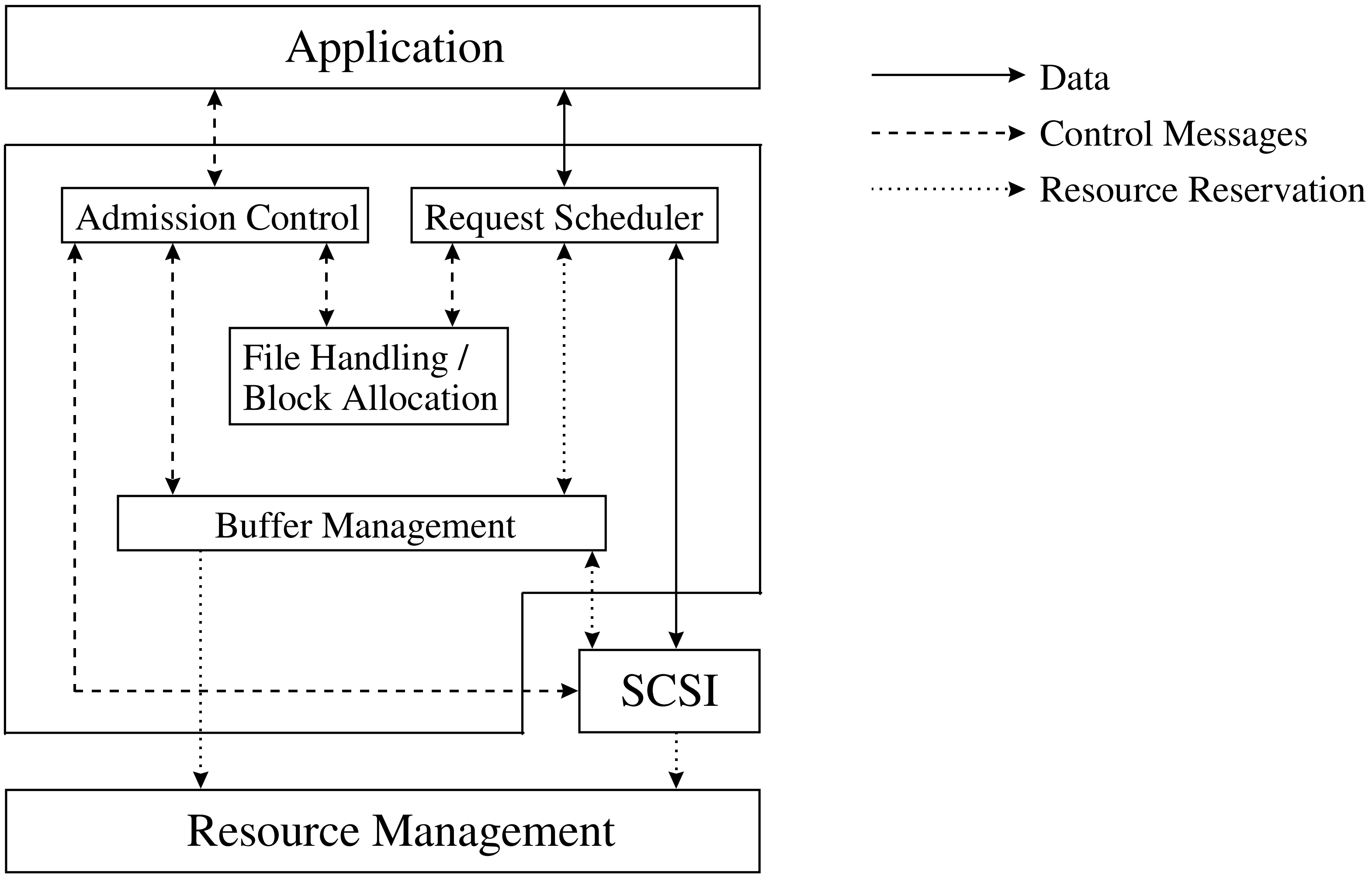
Application example: media storage server

Periodical Prefetch with Disk Array

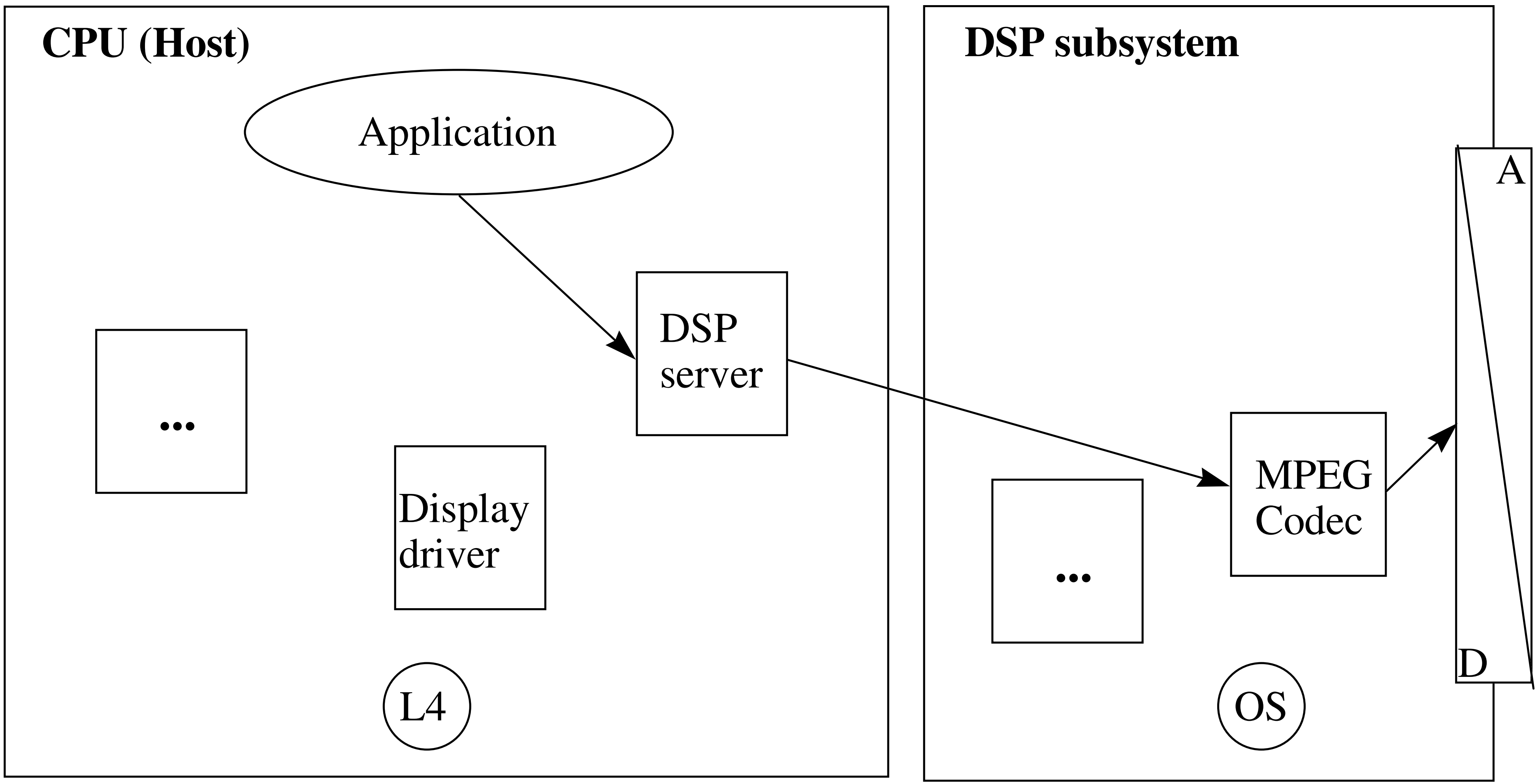


- read operation splitted into prefetch and read from cache
- no disconnect during read
- exactly one drive at a time sends data over SCSI bus
- restricted

Real-Time File System (II)



Multimedia Accelerators



Current Status

- L^4Linux implemented, optimized
- SCSI component ready-to-be-used (e.g., by file system)
- file system, networking component and accelerator soon to be introduced

More Information

- Härtig/Hohmuth/Schönberg/Wolter: The Performance of μ-Kernel-based Operating Systems (SOSP'97)
- Baumgartl/Härtig: Efficient communication mechanisms for DSP-based multimedia accelerators (ICSPAT'97)
- Hamann: On the Quantitative Specification of Jitter Constrained Periodic Streams (MASCOTS'97)
- Liedtke/Härtig/Hohmuth: OS-Controlled Cache Predictability for Real-Time Systems (RTAS'97)

`http://os.inf.tu-dresden.de/project/frontpage.html`